

First record of *Promops centralis* Thomas, 1915 (Chiroptera, Molossidae) in Santa Fe province, Argentina

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Abstract

We present the first record of *Promops centralis* Thomas, 1915 for Santa Fe province, Argentina. This species was previously known in Argentina only from Formosa province. This new record adds a second province to the distribution of this species in Argentina and a new ecoregion, the Espinal. Furthermore, this record extends the distribution area of *P. centralis* by almost 610 km to the south and increase to 24 the number of bats species in Santa Fe province.

Keywords

Big Crested Mastiff Bat, central-eastern Argentina, distribution, Espinal, range extension.

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Introduction

Santa Fe, a province that extends over a plain area of more than 132,000 km², is located in the central-eastern part of Argentina, and includes five ecoregions: Humid Chaco, Dry Chaco, Espinal, Pampa, and Delta and Islands of the Paraná (Burkart et al. 1999; Biasatti et al. 2016). Until now, 23 bat species have been cited for the province (Cabrera 1938; Yepes 1944; Crespo 1974; Vaccaro 1992; Barquez 2006; Pautasso 2008; Pautasso and Arnaudo 2009; Pautasso et al. 2009; Pavé et al. 2017; Montani et al. 2018), representing one-third of the bat diversity recorded for Argentina (Barquez et al. 2020).

Promops Gervais, 1856 is a Neotropical genus that currently includes three species of mastiff bats: *Promops*

centralis Thomas, 1915, *P. nasutus* (Spix, 1823), and *P. davisoni* Thomas, 1921 (Gregorin and Chiquito 2010); the first two are distributed in Argentina. *Promops davisoni* was considered either as a subspecies or a synonym of *P. centralis* (Handley 1966; Ojasti and Linares 1971; Koopman 1978), until Gregorin and Chiquito (2010) recognized it as valid species and separate it from *P. centralis*.

Promops nasutus has a wide distribution, but it is restricted to South America and islands of Trinidad and Tobago, with several records in northern and central Argentina, the southern distributional limit of the species. *Promops centralis* is distributed in the Neotropical region, occurring from Mexico to Costa Rica, and from

Colombia, Venezuela, and Guyana through Ecuador, Peru, Amazonia and the north coast of Brazil, Bolivia, Paraguay to northeastern Argentina (Eger 2008; Díaz et al. 2016; Solari 2019; Barquez et al. 2020; Hintze et al. 2020). Although *P. centralis* seems to be a common species due to its geographic distribution (Solari 2019), in Argentina it is poorly known, with records from only two localities.

The records of *P. centralis* in Argentina are represented by four specimens from northeastern Argentina in Formosa province (Barquez et al. 1999). These are historical records, more than 40 years old (Massoia 1976; Barquez et al. 1999) (Fig. 1).

Here we report *Promops centralis* from the province of Santa Fe, Argentina. This represents the first record for Santa Fe province, the second province for its presence, and the third known locality of this species in Argentina.

Methods

The specimen is deposited at the collection of the Museo Provincial de Ciencias Naturales “Florentino Ameghino”, Santa Fe. It was collected on May 12, 1994, in the Santa Fe city and donated by the Dirección General de Bioquímica y Farmacia, Laboratorio Central,

Ministerio de Salud Pública de Santa Fe. Because the specimen was used for rabies analysis, the upper part of the skull is broken, and consequently some cranial measurements cannot be taken. The specimen was misidentified in the collection as *Tadarida brasiliensis* (I. Geoffroy Saint-Hilaire, 1824), and remained so until our current re-examination.

The specimen had been preserved in formaldehyde since 1994, which produced an extremely poor state of preservation, with loss of skin and muscles, which were gelatinous and detached from bones. The skull and skeleton were cleaned using dermestid beetles, but due to the time that the specimen remained in immersion the bones were too soft and the teeth lost part of the enamel.

External and cranial measurements were obtained following Díaz et al. (1998) and Barquez et al. (1999). For the identification of the specimen, we used morphological keys from Barquez et al. (1999), Díaz et al. (2016), and Barquez et al. (2020).

Results

Molossidae

Promops centralis Thomas, 1915

Figures 1–3

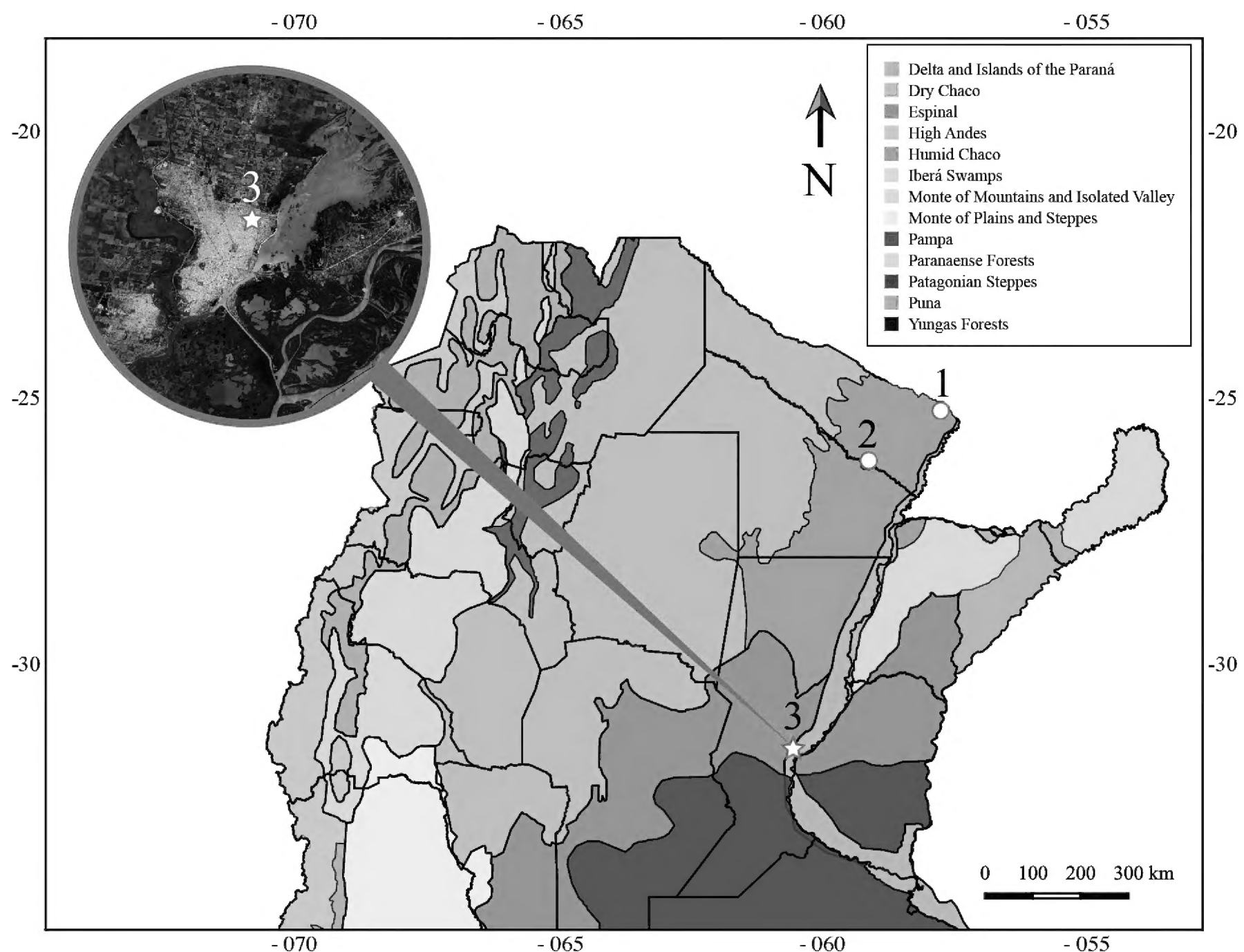


Figure 1. Distribution of *Promops centralis* in Argentina. The circles indicate previously known localities and the star shows the new record: (1) Clorinda, Pilcomayo Department, Formosa; (2) El Colorado, Pirané Department, Formosa; and (3) Santa Fe, La Capital Department, Santa Fe.

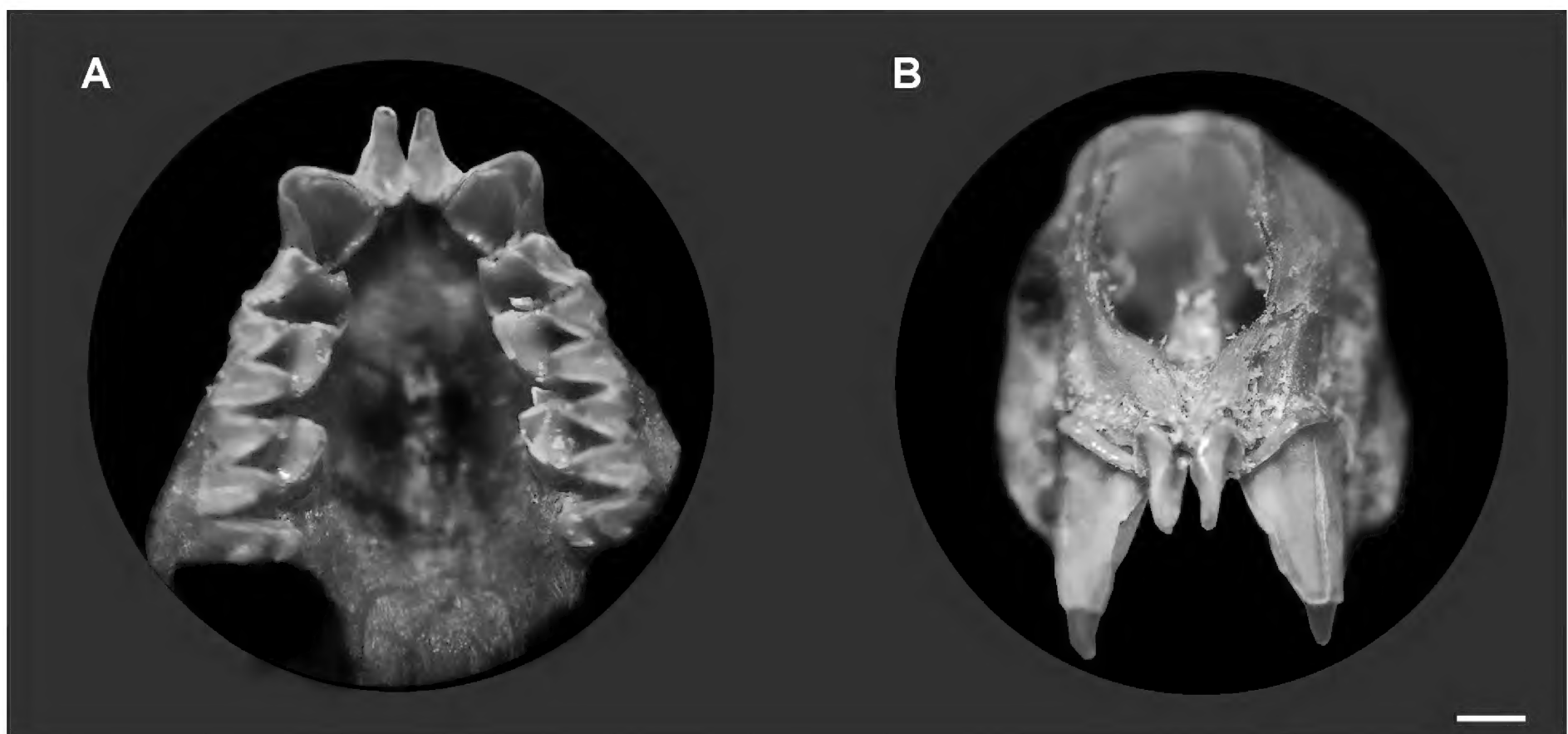


Figure 2. *Promops centralis* (MFA-ZV-M: 543). **A.** View of the strongly domed palatal. **B.** Frontal view of the rostrum, triangular and long with divergent tips upper incisors. Scale bar: 1 mm.

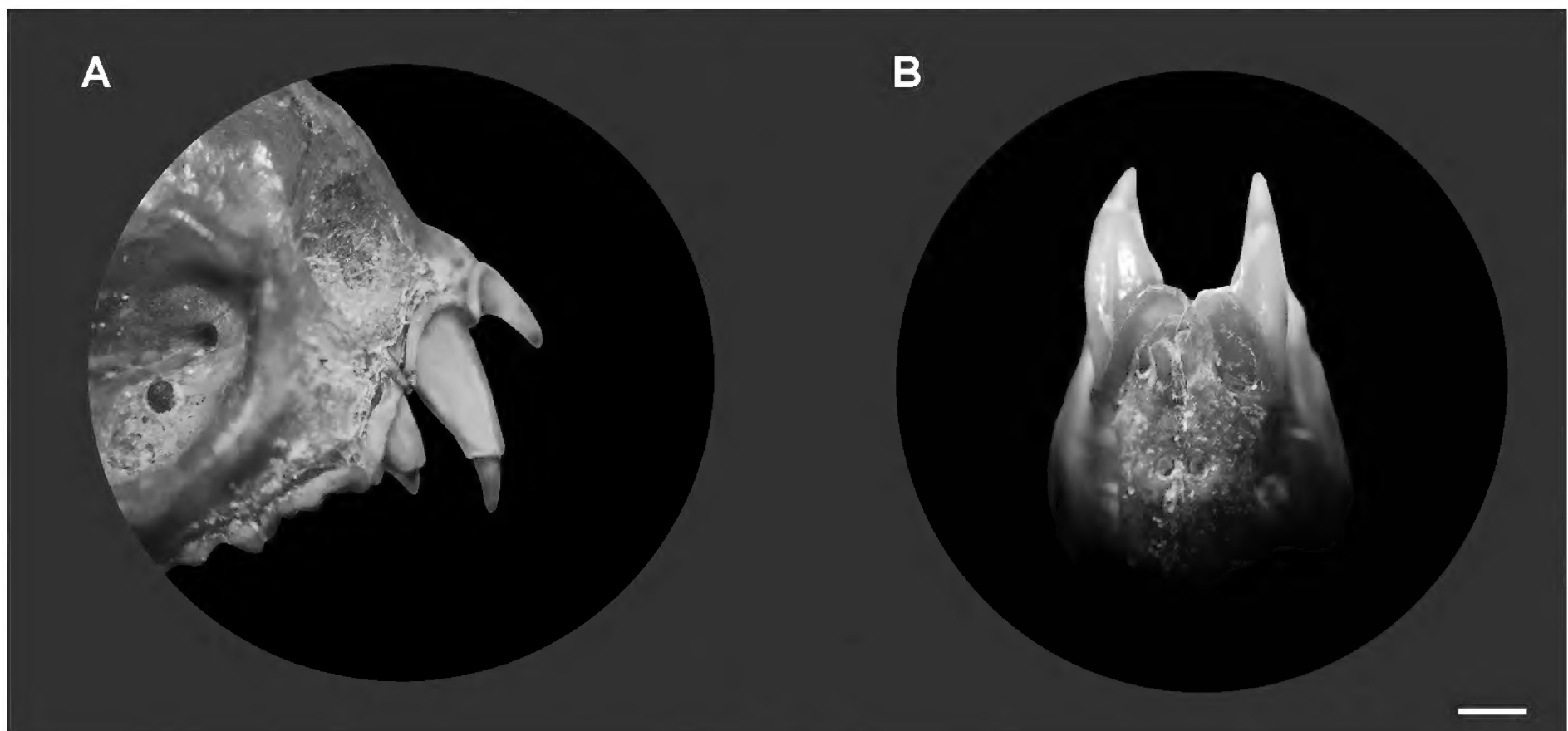


Figure 3. *Promops centralis* (MFA-ZV-M: 543). **A.** Lateral view of the rostrum. Long, thin and proodont upper incisors and reduced first upper premolar are observed. **B.** Frontal view of the mandible, the two pairs of lower incisors are observed. Scale bar: 1 mm.

Material examined. ARGENTINA • 1 ♂, adult; Santa Fe Province, La Capital Department, Santa Fe; 31°35' 57.07"S, 060°40'54.08"W; 12 May 1994; Dirección General de Bioquímica y Farmacia exped.; MFA-ZV-M: 543.

Identification. The characteristics of the examined specimen agree with descriptions of *P. centralis* provided by Barquez et al. (1999), Barquez and Díaz (2009), and Díaz et al. (2016).

Promops is a genus characterized by a strongly domed median keel on the muzzle, the ears are short and slightly separated, the antitragus is rounded and well developed, the wings are long and narrow, the tail is long, and the calcars are more developed than in other genera of this family, almost reaching the tail. Although the specimen from Santa Fe was in poor preservation conditions,

these characteristics were clearly observed. The genus is similar to *Molossus* É. Geoffroy, 1805, specially the larger species, but in *Molossus* the keel on the muzzle is straight and the calcar is comparatively shorter.

The main difference between the two *Promops* species distributed in Argentina is the size, with *P. centralis* having a larger forearm (>50 mm) and *P. nasutus* with a smaller forearm (in general <50 mm). The forearm length of the specimen reported here is 53.52 mm (Table 1).

The preservation condition of the skull is poor, but some characteristics can be recognized, such as a short rostrum, sagittal crest well-developed but low, zygomatic arches complete but thin, and a palate strongly domed (Fig. 2A); a diagnostic characteristic of the genus that differs from the comparatively flat palate of all other

Table 1. Mean, standard deviation, and number of specimens (n) of the external and cranial measurements (mm) of the new record from Santa Fe compared with *Promops centralis* and *P. nasutus* from Argentina (Barquez et al 1999).

| Measurements | MFA-ZV-M:543 | Barquez et al. (1999) | |
|-------------------------------|--------------|--------------------------|------------------------|
| | | <i>Promops centralis</i> | <i>Promops nasutus</i> |
| Total length | 128.00 | 129.50 ± 3.31 (n = 4) | 117.60 ± 4.61 (n = 13) |
| Tail length | 55.50 | 50.50 ± 1.91 (n = 4) | 50.50 ± 2.63 (n = 13) |
| Hindfoot length | 11.00 | 10.50 ± 1.00 (n = 4) | 8.20 ± 1.67 (n = 13) |
| Ear length | 15.00 | 15.60 ± 3.64 (n = 4) | 13.60 ± 1.07 (n = 13) |
| Forearm length | 53.52 | 53.30 ± 0.47 (n = 4) | 47.40 ± 1.16 (n = 13) |
| Greatest length of skull | — | 19.80 ± 0.45 (n = 4) | 17.00 ± 0.55 (n = 12) |
| Breadth of braincase | — | 10.10 ± 0.26 (n = 4) | 9.40 ± 0.18 (n = 12) |
| Postorbital constriction | 3.96 | 4.10 ± 0.12 (n = 4) | 3.90 ± 0.11 (n = 12) |
| Zygomatic breadth | 10.88 | 12.80 ± 0.40 (n = 3) | 10.70 ± 0.55 (n = 12) |
| Length of maxillary toothrow | 6.52 | 7.30 ± 0.15 (n = 3) | 6.30 ± 0.17 (n = 12) |
| Palatal length | 8.24 | 7.20 ± 0.25 (n = 3) | 5.70 ± 0.17 (n = 12) |
| Width across canines | 4.18 | 5.00 ± 0.15 (n = 4) | 4.10 ± 0.17 (n = 12) |
| Width across molars (M2-M2) | 6.88 | 8.80 ± 0.20 (n = 3) | 7.70 ± 0.39 (n = 12) |
| Length of mandible | 12.72 | 14.20 ± 0.25 (n = 3) | 11.70 ± 0.22 (n = 11) |
| Length of mandibular toothrow | 7.36 | 8.30 ± 0.46 (n = 3) | 7.00 ± 0.20 (n = 11) |

genera of molossids. Regarding the dentition, it is possible to observe the proodont upper incisors, triangular and long with divergent tips (Figs 2B, 3A), two pairs of lower incisors (internal incisor slightly larger than the external one) in front of the well-developed cingulum of canines (these are in contact) (Fig. 3B), and two upper premolars, with the first one being very small (reduced to a spicule) and the second one large and triangular in lateral view (Fig. 3A). In the similar genus *Molossus*, the upper incisors are short and projected downward, their tips in contact, there is only one pair of lower incisors, and one upper premolar on each side.

Discussion

Promops centralis has a wide distribution from Mexico to Argentina, with apparent large local populations (Eger 2008; Solari 2019; Díaz et al. 2016; Barquez et al. 2020). However, in Argentina the species was only known by four specimens from two localities at Formosa province: Clorinda, 13 km to the south, on Route 11 (Pilcomayo Department) (25°23'S, 057°47'W), and El Colorado (Pirané Department) (26°18'S, 059°22'W), collected 40 years ago (Barquez et al. 1999, 2020) (Fig. 1).

The new record, collected during the fall (on the southern hemisphere), extends the distribution of the species by approximately 610 km south, representing the southernmost known record for *Promops centralis*, and increases the number of bats species in Santa Fe province to 24. In Argentina, it adds a new record locality, representing the third site in the country, and a new province. Until now, the species was recorded only in the Humid Chaco, so with this new locality, the Espinal ecoregion is added, although it is important to mention that the specific collection locality is within an urban area.

In the last decades, bats have been studied intensively in Argentina, but most studies have been carried out in the northwestern region (e.g., Mares et al. 1989, 1995, 1996; Barquez and Ojeda 1992; Barquez et al. 1993,

1999, 2009, 2017; Barquez and Díaz 2001, 2009; Barquez 2006; López Berrizbeitia and Díaz 2013; Díaz et al. 2016; Gamboa Alurralde et al. 2016; Urquizo et al. 2017; Díaz et al. 2019; Sanchez et al. 2019). In central Argentina, the knowledge on the bat fauna is still scarce. This province represents, therefore, a potential gap in the distribution of many species, as highlighted by our new record.

This new record, from an old material, increased the knowledge about the diversity of bats in Argentina, demonstrating the importance of the use and revision of collections as a source of new information. It is also important to emphasize the need for proper preparation and preservation of the specimens, according to the secure protocols, in order to preserve them for the future.

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Authors' Contributions

MEM cleaned (skull and skeleton) and identified the specimen, took the pictures of the skull, wrote and reviewed the manuscript; MMD identified the specimen, wrote and reviewed the manuscript; AAP facilitated the access to the specimen at the collection of Museo Provincial de Ciencias Naturales “Florentino Ameghino” and reviewed the manuscript.

References

Barquez RM (2006) Orden Chiroptera. In: Barquez RM, Díaz MM, Ojeda RA (Eds) Mamíferos de Argentina, sistemática y distribución. Sociedad Argentina para el Estudio de los Mamíferos (SAREM), Mendoza, 56–86.

- Barquez RM, Ojeda RA (1992) The bats (Mammalia: Chiroptera) of the Argentine Chaco. *Annals of the Carnegie Museum* 61: 239–261.
- Barquez RM, Díaz MM (2001) Bats of the Argentine Yungas: a systematic and distributional analysis. *Acta Zoológica Mexicana (Nueva Serie)* 82: 29–81.
- Barquez RM, Díaz MM (2009) Los murciélagos de Argentina: clave de identificación. *Publicación Especial N° 1, PCMA*. Editorial Magna, Tucumán, 84 pp.
- Barquez RM, Giannini NP, Mares MA (1993) Guide to the bats of Argentina. Special Publication. Oklahoma Museum of Natural History, Norman, 119 pp.
- Barquez RM, Mares MA, Braun JK (1999) The bats of Argentina. Special Publications of the Museum of Texas Tech University 42: 1–275.
- Barquez RM, Miotti MD, Idoeta FM, Díaz MM (2017) Two new species of *Myotis* (Chiroptera: Vespertilionidae) for Argentina. *Papéis Avulsos de Zoologia* 57 (22): 287–294. <https://doi.org/10.11606/0031-1049.2017.57.22>
- Barquez RM, Díaz MM, Montani ME, Pérez MJ (2020) Nueva guía de los murciélagos de Argentina. *Publicación Especial N° 3, PCMA*, Tucumán, Argentina, 183 pp.
- Biasatti NR, Rozzatti JC, Fandiño B, Pautaso A, Mosso E, Marteleur G, Algarañaz N, Giraudo A, Chiarulli C, Romano M, Ramírez Llorens P, Vallejos L (2016) Las ecoregiones, su conservación y las Áreas Naturales Protegidas de la provincia de Santa Fe. Ministerio de Medio Ambiente, Santa Fe, 244 pp.
- Burkart R, Bárbaro NO, Sánchez RO, Gómez DA (1999) Eco-regiones de la Argentina. Administración de Parques Nacionales – Programa de Desarrollo Institucional Ambiental, Buenos Aires, 43 pp.
- Cabrera A (1938) Dos murciélagos nuevos para Argentina. *Notas del Museo de La Plata* 3: 5–14.
- Crespo JA (1974) Comentarios sobre nuevas localidades para mamíferos de Argentina y de Bolivia. *Revista del Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” e Instituto Nacional de Investigaciones de las Ciencias Naturales, Zoología* 11: 1–31.
- Díaz MM, Flores DA, Barquez RM (1998) Instrucciones para la preparación y conservación de mamíferos. *Publicaciones Especiales No 1, Programa de Investigaciones de Biodiversidad Argentina (PIDBA)*, Tucumán, 44 pp.
- Díaz MM, Solari S, Aguirre L, Aguiar LMS, Barquez RM (2016) Clave de identificación de los murciélagos de Sudamérica/Chave de identificação dos morcegos da América do Sul. *Publicación Especial N° 2, Programa de Conservación de los Murciélagos de Argentina (PCMA)*, Editorial Magna Publicaciones, Yerba Buena, 160 pp.
- Díaz MM, Romero NM, Ramos Barreira MM, Morales Soler JJ, Barquez RM (2019) The presence of *Peropteryx macrotis* (Mammalia, Chiroptera, Emballonuridae), a new family, genus and species of bat for Argentina. *Check List* 15 (5): 945–949. <https://doi.org/10.15560/15.5.945>
- Eger JL (2008) Family Molossidae P. Gervais, 1856. In: Gardner AL (Ed) *Mammals of South America*, vol. I. Marsupials, xenarthrans, shrews and bats. The University of Chicago Press, Chicago, 399–440.
- Gamboa Alurralde S, Sanchez RT, Barquez RM, Díaz MM (2016) New records of bats (Chiroptera, Mammalia) from Argentina. *Check List* 12 (2): 1873. <https://doi.org/10.15560/12.2.1873>
- Gregorin R, Chiquito EA (2010) Revalidation of *Promops davisoni* Thomas (Molossidae). *Chiroptera Neotropical* 16: 648–660.
- Handley CO Jr. (1966) Checklist of the mammals of Panama. In: Wenzel RL, Tipton VJ (Eds) *Ectoparasites of Panama*. The Field Museum of Natural History, Chicago, 753–795.
- Hintze F, Arias-Aguilar A, Dias-Silva L, Delgado-Jaramillo M, Rodrigues Silva C, Jucá T, Mischiatti FL, Almeida M, Bezerra B, Aguiar LMS, Ramos Pereira MJ, Bernard E (2020) Molossid unlimited: extraordinary extension of range and unusual vocalization patterns of the bat, *Promops centralis*. *Journal of Mammalogy* 101 (2): 417–432. <https://doi.org/10.1093/jmammal/gyz167>
- Koopman KF (1978) Zoogeography of Peruvian bats with special emphasis on the role of the Andes. *American Museum Novitates* 2651: 1–33.
- López Berrizbeitia MF, Díaz MM (2013) Diversidad de murciélagos (Mammalia, Chiroptera) en la ciudad de Lules, Tucumán. *Acta Zoológica Mexicana* 29: 234–239.
- Mares MA, Barquez RM, Braun JK (1995) Distribution and ecology of some Argentine bats. *Annals of the Carnegie Museum* 64: 219–237.
- Mares MA, Ojeda RA, Barquez RM (1989) The mammals of Salta province, Argentina. The University of Oklahoma Press, Norman, 320 pp.
- Mares MA, Barquez RM, Braun JK, Ojeda RA (1996) Observations on the mammals of Tucumán Province, Argentina. I. Systematics, distribution, and ecology of the Didelphimorphia, Xenarthra, Chiroptera, Primates, Carnivora, Perissodactyla, Artiodactyla, and Lagomorpha. *Annals of the Carnegie Museum* 65: 89–152.
- Massoia E (1976) Cuatro notas sobre murciélagos de la República Argentina (Molossidae y Vespertilionidae). *Physis* 35: 257–265.
- Montani ME, Gamboa MD, Fabre FN, Antoniazzi LR, Arancio V, Carmona JF, Pautasso AA, Colombo VC (2018) First records of *Myotis nigricans* (Schinz, 1821) (Chiroptera, Vespertilionidae) and two new localities for three bat species in Santa Fe province, Argentina. *Check List* 14 (5): 737–742. <https://doi.org/10.15560/14.5.737>
- Ojasti J, Linares OJ (1971) Adiciones a la fauna de murciélagos de Venezuela con notas sobre las especies del género *Diclidurus* (Chiroptera). *Acta Biológica Venezolana* 7: 421–41.
- Pautasso AA (2008) Mamíferos de la provincia de Santa Fe, Argentina. *Comunicaciones del Museo Provincial de Ciencias Naturales Florentino Ameghino (Nueva Serie)* 13: 1–248.
- Pautasso AA, Arnaudo ME (2009). Primeros registros del murciélago rojo (*Myotis ruber*) para la provincia de Santa Fe, Argentina. *Biológica* 10: 59–61.
- Pautasso AA, Bevilacqua MS, de la Peña MR, Ramírez C (2009) Observaciones sobre los murciélagos (Mammalia, Chiroptera) de la provincia de Santa Fe, Argentina. *Natura Neotropicalis* 40: 95–101.
- Pavé R, Cristaldi MA, Rodríguez ME, Barquez, Gavazza AI, Giraudo AR (2017) Nuevos registros de murciélagos para la provincia de Santa Fe, Argentina. *Mastozoología Neotropical* 24: 153–162.
- Sánchez RT, Montani ME, HI Tomasco, Díaz MM, Barquez RM (2019) A new species of *Eptesicus* (Chiroptera, Vespertilionidae) from Argentina. *Journal of Mammalogy* 100 (1): 118–129. <https://doi.org/10.1093/jmammal/gyz009>
- Solari S (2019) *Promops centralis*. The IUCN Red List of threatened species 2019: e.T88087651A22036112. <https://doi.org/10.2305/IUCN.UK.2019-1.RLTS.T88087651A22036112.en>
- Urquiza JH, Díaz MM, Barquez RM (2017) Una nueva especie de *Myotis* (Chiroptera: Vespertilionidae) para la Argentina. *Mastozoología Neotropical* 24: 257–261.
- Vaccaro OB (1992) Comentarios sobre nuevas localidades para quirópteros de Argentina (Vespertilionidae y Molossidae) (Mammalia, Chiroptera). *Revista del Museo Argentino de Ciencias Naturales* 15: 27–36.
- Yepes J (1944) Comentarios sobre cien localidades nuevas para mamíferos sudamericanos. *Revista Argentina de Zoogeografía* 4: 59–71.